



Analysis of Industrial Engineering Brand Awareness Improvement Using SWOT and Quantitative Strategic Planning Matrix (QSPM)

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ABSTRACT

There are many universities in Indonesia that have Industrial Engineering Departments, until 2015 the Industrial Engineering Study Program was registered in 187 universities. There were only 6 out of 100 respondents who wanted to enter the Industrial Engineering Department, University X, and as many as 54% did not understand the major– majors in the Faculty of Engineering, University X, based on the questionnaire distributed. In this study, the SWOT and QSPM strategies were carried out in order to be able to analyze how to increase the level of brand awareness in Industrial Engineering University X. The distribution of the first questionnaire was used to find out where the brand awareness was in the Industrial Engineering Department, University X with high school students as respondents. The second questionnaire was distributed to find out whether the internal or external factors contained in the Department of Industrial Engineering, University X were strengths or weaknesses. With the presence of internal and external factors, the SWOT strategy can be implemented. The SO strategy is the right thing to do by the Department of Industrial Engineering, University X based on a SWOT analysis. These strategies include: 1) socializing the achievement of JTI UX that has been accredited A and an average GPA of above 3 to prospective students. 2) increase the number of lecturers who are involved in Joint Research on S2 and S3 lecturers. 3) increase accreditation to international level. 4) increase the number of cooperation with international industry. 5) increase and expand cooperation in the fields of education, research, and community service with external parties both at the national and international levels. 6) make Industrial Engineering graduates who are in national or international industries to help fill guest lectures at the Department of Industrial Engineering, University X. Based on the analysis of the QSPM method, a highly recommended strategy is to increase accreditation to an international level.

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1. INTRODUCTION

At this time the need for education is very important, seen from the government program which recommends that the Indonesian people must have a minimum of 12 years of education which is

based on its policies (Raodhany, 2018), such as the 1945 Constitution, Law number 20 of 2003, and many more (Judge, 2016). Therefore, the community's need for higher education is also getting bigger (Suharso et al., 2020) It can be seen from the number of universities that have sprung up, both private universities (PTS) or state universities (PTN) (Sinatra & Darmastuti, 2008) where the competition of each university to produce quality students (Garaika & Feriyan, 2019).

There are quite a number of universities that have majors in Industrial Engineering in Indonesia. Until 2015 the Industrial Engineering Study Program registered as many as 187 universities (Susmiati, 2018). One of the universities in Malang is Industrial Engineering, University X. Until 2015 it was still accredited B (Asmoro & MZ, 2019). In 2015 there were 15 Universities in Industrial Engineering with A accreditation, namely: 6 state universities (PTN) and 9 private universities (PTS) (Tohir, 2020) (Toman, Tomas, 2016). However, in November 2016 accreditation from Industrial Engineering University X has reached A (Rusmadi, 2016). With these data, it shows that there are many alternative choices for prospective new students to continue their studies in Industrial Engineering (Nurdin & Dinnullah, 2017).

The Department of Industrial Engineering, University X has the advantage that it is a state university (PTN) and has A accreditation (Nudin, 2017). Accreditation is very important to maintain reputation which is very important for companies when looking for graduates (Widayat, 2018). In this study, a preliminary questionnaire was distributed to find out how much awareness of prospective students when they wanted to enter the university. The results of the questionnaire are shown in Figure 1.1 and Figure 1.2. Figure 1.1 shows that the awareness of prospective students at Industrial Engineering University X is still lacking, in the diagram it shows that from 100 respondents who want to enter Industrial Engineering University X in the first choice there are as many as 6 people.

2. RESEARCH METHOD

2.1 Data and Data Type

In this research, there are two kinds of data needed, secondary and primary. The primary data used here are the results of the questionnaires that have been distributed and the data of the required majors (Sarwono, 2010). The secondary data is data from the web data of the Faculty of Engineering, University X regarding Industrial Engineering enthusiasts at University X (Faruqhy et al., 2021).

2.2 Types Of Research

This type of research is descriptive research, where this study aims to present an overview of the data and analysis results (Yuliani, 2018). According to (Narbuko, 2007:44) descriptive research is research that seeks to find solutions to existing problems based on the data obtained (Nadia, 2017).

3. RESULTS AND DISCUSSIONS

3.1. Respondent Characteristics Data

Table 1. Percentage of Prospective Student Identity

Katego	Respondent's choice	Percentage
Gender	Man	45%
	Woman	55%
Rcollege reference	School/ BP teacher	12%
	Bimstudy guide	46%
	Kelfamily	20%
	Teman	10%
	Bsize or Promotional Media	12%

Katego	Respondent's choice	Percentage
Udrain	16	15%
	17	43%
	18	25%
	19	17%

3.2. SWOT Data Processing

Table 2. Identification of SWOT on Internal Factors

No.	Statement
1	In 2020, JTI UX has a vision to have a reputation at the Southeast Asian level melalPTN 4 process of education, research, and community service.
2	JTI UX has a mission to provide relevant IT higher education programs with the needs of industry and society to produce quality graduates, entrepreneurial spirit, and virtuous character.
3	JTI UX has a mission to conduct research and community service in order to mdevelop and disseminate science and technology in the field of IT, as well as improve people's lives.
4	JTI UX already has A accreditation.
5	JTI UX does not yet have an integrated laboratory
6	JTI UX has facilities, including: 725 titles of books, 40 units of laboratory computers, statistical test software, physiology measuring instrument, simulation software, engraver machine, 3D laser scanner, and impact printer/ 3D milling.
7	JTI UX doesn't have professors yet
8	D5 people with doctoral education at JTI UX.
9	D33 people with postgraduate education at JTI UX.
10	JTI UX students are able to achieve 14 achievements in 1 year, both nationally and internationally iinternational.
11	At JTI UX students can be involved in lecturer research.
12	BThere are many extracurricular activities that can increase students' interests and talents to become an achievement.
13	Industrial engineering graduates on average graduate with a GPA above 3 and with a graduation time of 4 tahun
14	Bthe number of seminars conducted by Industrial Engineering.
15	JurIndustrial Engineering Department hosted the 2017 BKSTI congress.
16	Athe existence of community service activities by JTI UX lecturers and from JTI students UX.
17	Kacademic curriculum that is in accordance with market needs
18	JTI UX has a Quality Assurance Unit
19	Rreading money JTI UX has access to UB e-books and UB e-journals.
20	JTI UX doesn't have an International class yet
21	JTI UX does not yet have a national or international scientific publication patent

Table 3. SWOT Identification on External Factors

No.	Statement
1	Ascholarship funds are given to JTI UX students.
2	The high interest of parents to send their children to State Universities
3	Athe availability of joint research activities with foreign and domestic universities is increasing.
4	Athe existence of collaborative activities with industry in Indonesia.
5	Athe existence of collaborative activities with PT. overseas.
6	BMany graduates have careers in bona fide national and international companies
7	High interest of high school students who want to study in Industrial Engineering University X
8	Athe existence of collaborative activities with middle and high schools.

No.	Statement
9	The process of making the Industrial Engineering curriculum involves both internal and external stakeholders external.
10	worka the same as the software providers are still open.
11	High quality competition in the Department of Industrial Engineering at various universities
12	KThe economic ability of the Indonesian people to study at universities is still rlow.
13	Industrial Engineering graduates from Southeast Asian countries are free to have a career in Indonesia after MEA is officially underway.

3.3.1 SWOT Classification of External Factors

Table 4. SWOT classification of JTI UX External factors

No.	Aanalysis	Bobo	Rating
Opportunity			
O1	Ascholarship funds are given to JTI UX students.	0.1	3.3
O2	The high interest of parents to send their children to college High Country	0.09	3.04
O3	Athe existence of joint research activities with foreign and domestic universities mincrease.	0.08	2.62
O4	Athe existence of collaborative activities with PT. overseas.	0.08	3.05
O5	BMany graduates have careers in well-known national companies and iinternational.	0.08	2.94
O6	High interest of high school students who want to study in Industrial Engineering Uuniversity X	0.09	2.81
O7	Athe existence of collaborative activities with middle and high schools.	0.08	2.6
O8	The process of making the Industrial Engineering curriculum involves both stakeholders iinternal or external.	0.07	2.95
O9	worka the same as the software providers are still open.	0.05	2.66
Athreats			
T1	High quality competition in the Department of Industrial Engineering in various countries Uuniversity	0.07	2.44
T2	Kthe economic ability of the Indonesian people to study at universities High is still low	0.07	2.18
T3	Industrial Engineering graduates from Southeast Asian countries are free to have a career in IIndonesia after MEA officially takes place	0.06	2.37
T4	Athe existence of collaborative activities with Indonesian industry	0.08	2.45

3.3.2 Internal Factor SWOT Classification

Table 5. SWOT Classification of Internal Factors

No.	Aanalysis	Bobo	Rating
Kstrength			
S1	In 2020, JTI UX has a vision to have a reputation for tiSoutheast Asia level through PTN 4 processes of education, research, and community service.	0.06	3.11
S2	JTI UX has a mission to organize educational programs tihigh level of IT that is relevant to the needs of industry and society to produce quality graduates, entrepreneurial spirit, and virtuous character.	0.06	3.15
S3	JTI UX has a mission to do research and service kto the community in order to develop and disseminate science and technology in the IT field, as well as increase the level of kcommunity life.	0.06	3.13
S4	JTI UX already has A accreditation.	0.08	3.44

No.	Aanalysis	Bobo	Rating
Kstrength			
S5	JTI UX has facilities, including: 725 book titles, 40 computers laboratory, statistical test software, physiology measuring instrument, simulation software, engraver machine, 3D laser scanner, and impact printer/ 3D milling.	0.02	2.67
S6	D33 students with master's degree education at JTI UX.	0.05	2.7
S7	JTI UX students are able to achieve 14 achievements in 1 year, good national and international.	0.05	2.65
S8	At JTI UX students can be involved in lecturer research.	0.03	2.7
S9	BThere are many extracurriculars that can increase interests and talents mstudents become an achievement.	0.04	2.62
S10	Industrial engineering graduates on average graduate with a GPA above 3 and with w4 year graduation certificate	0.05	2.79
S11	Kmarket-appropriate academic curriculum	0.05	2.75
S12	JTI UX has a quality assurance unit	0.06	2.88
S13	Rreading money JTI UX has access to UB e-books and UB e-journals.	0.03	2.66
S14	Bthe number of seminars conducted by Industrial Engineering.	0.06	2.78
S15	Athe existence of community service activities by JTI UX lecturers and from mJTI UX students.	0.04	3.13
S16	JurIndustrial Engineering Department hosted the 2017 BKSTI congress.	0.05	2.7
Kelemahan			
W1	JTI UX does not yet have an integrated laboratory	0.03	2.31
W2	JTI UX doesn't have professors yet	0.06	2.25
W3	D5 people with doctoral education at JTI UX	0.04	2.32
W4	JTI UX doesn't have an International class yet	0.05	2.21
W5	JTI UX does not yet have a scientific publication patent, both nationally and internationally iinternational	0.03	2.39

3.3.2 SWOT Analysis Score Calculation

Table 6. JTI UX External Strategy Factor Matrix

No.	Aanalysis	Bobo (B)	Rating (R)	Score (BxR)
Opportunity				
1	Ascholarship funds given to JTI students UX.	0.1	3.3	0.33
2	The high interest of parents to send their children to school at State University	0.09	3.04	0.274
3	Athe existence of joint research activities with external and internal universities country increases.	0.08	2.62	0.21
4	Athe existence of collaborative activities with PT. overseas.	0.08	3.05	0.244
5	BMany graduates have careers in well-known companies national and international.	0.08	2.94	0.235
6	High interest of high school students who want to study in Engineering IX University industry	0.09	2.81	0.253
7	Athe existence of collaborative activities with middle and high schools.	0.08	2.6	0.208
8	The process of making the Industrial Engineering curriculum involves: stakeholders both internal and external.	0.07	2.95	0.207
9	worka the same as the software providers are still open. Athreats	0.05	2.66	0.133
10	High quality competition in the Department of Industrial Engineering in various universities	0.07	2.44	0.171

No.	Aanalysis	Bobo (B)	Rating (R)	Score (BxR)
	Opportunity			
11	Kthe economic ability of the Indonesian people to study in college is still low	0.07	2.18	0.153
12	Graduates of Industrial Engineering from Southeast Asian countries free career in Indonesia after MEA officially takes place	0.06	2.37	0.142
13	Athe existence of collaborative activities with Indonesian industry	0.08	2.45	0.196
	total	1		2.754

3.3.2 SWOT Quadrant

After getting the values obtained from the IFE and EFE values above, with these values it can be seen where the position of the company is by using the SWOT quadrant. The SWOT quadrant will display the position of the company in quantitative form. The way to find the results from these quadrants can be done by combining the IFE and EFE values that have been obtained and then entered into the SWOT Quadrant. The value contained in the SWOT quadrant can be done in the following way. First do the total value of IFE and EFE and then subtract 2.5 so that the cut point is at point 0, because the determination of the rating is 1–4. Calculation of internal factors $2.781 - 2.5 = 0.281$. Then the external calculation is $2.754 - 2.5 = 0.254$. With the following numbers, the internal coordinates of the point are 0, 281 and the external coordinates point is 0.254. At this coordinate point, the company is in quadrant 1, which is supporting the use of an aggressive strategy. (5.) SWOT Strategy. From the quadrant above, it is known that the Department of Industrial Engineering UB is in quadrant 1 where the strategy that must be used is an aggressive strategy. In this diagram, statements are made using symbols which can be seen in Tables 4.10 and 4.11. The decision making is taken from the IFE and EFE matrices which produce four alternative possibilities, namely SO, ST, WO, WT strategies which can be used according to quadrants. Since the Industrial Engineering Department of University X is in quadrant 1, what is used at this stage is only the SO strategy,

3.3.3 QSPM Matrix

After looking for a suitable strategy for JTI UX, the next stage is used, namely by looking for the best strategy among existing strategies using QSPM. Using QSPM in order to determine the attractiveness score (AS) of the strategies that have been made from internal and external factors. The value (AS) used is 4 = high attractiveness 3 = moderate attractiveness 2 = low attractiveness 1 = no attractiveness. After being given a value (AS), the next step is to multiply the AS from each alternative strategy with a weight that has been determined at the time of making the IFE and EFE matrices where that number is the total attractiveness score (TAS). From Table 4.14 we get SO1, SO2, SO3, SO4, SO5, and SO6, where these strategies will be used as symbols in Table 4. 15 for alternative strategies. After calculating the QSPM table above, it is found that the alternative strategy that should be used is the SO 3 strategy. The SO 3 strategy is a strategy by increasing accreditation to an international level. The next strategies are strategies 6 and 2, namely, adding and expanding cooperation in the fields of education, research, and community service with external parties, either at the national or international level. Strategy 2 is to increase the number of lecturers involved in joint research on S2 and S3 lecturers. The next strategies are strategies 6 and 2, namely, adding and expanding cooperation in the fields of education, research, and community service with external parties, either at the national or international level. Strategy 2 is to increase the number of lecturers involved in joint research on S2 and S3 lecturers. The next strategies are strategies 6 and 2, namely, adding and expanding cooperation in the fields of education, research, and community service with external parties, either at the national or international level. Strategy 2 is to increase the number of lecturers involved in joint research on S2 and S3 lecturers.

3.3.4 Marketing Strategy Analysis

After the analysis of internal and external factors will be determined by the quadrant position in the Department of Industrial Engineering, University X. The position of the Department is in the aggressive strategy which will be adjusted to the SWOT in accordance with the quadrant I strategy.

3.3.4.1 Analysis of IFE and EFE

Senot yet entered into the internal and external matrix where the statement of strengths and weaknesses will enter the matrix of internal factors and also the statement of opportunities and threats into the matrix of external factors. Where is the process? Industrial Engineering University X is located by distributing questionnaires to school children in which the questionnaire contains a comparison of the knowledge of high school students from the Industrial Engineering Department at University X with the leading Industrial Engineering Departments located in other regions. After getting where the Industrial Engineering of University X is known, internal and external matrices of the Industrial Engineering Department of University X can be arranged, so a weight is needed for each of the statements entered into the matrix. The weight is obtained from the head of the Department of Industrial Engineering, University X.

SeAfter the statements obtained have been weighted, the next step is to calculate the average rating value of each question distributed to 100 questionnaires distributed to high school students that are randomly located. After obtaining the results of the average of the rating values, the strengths and weaknesses of the internal matrix can be separated. Likewise, the rating value of opportunities and threats on external factors. Due to the rating measurement using a Likert scale from 1-4, the internal factor for the strength value is from 2.51 to rating 4, it is included in the strength and for weakness is entered from the rating.

1–2.5. For example, for the strength factor from the number of extracurriculars that can increase students' interests and talents into an achievement, it has a value of 2.62, this makes the factor into strength. The strength factor with the greatest value is that JTI UX already has an A accreditation with a value of 3.44. The value below 2.5 is a weakness with an example of a doctoral education lecturer at JTI UX as many as 6 people, with a value of 2.32, then this factor is included in the weakness section. Likewise with external factors where the value of 2.51-4 is included in the opportunity and the rating value of 1-2.5 is the value for the threat. The example for factors that are included in the opportunity is the existence of collaborative activities with SMP and SMA with a value of 2.6. The highest value of this opportunity is the scholarship given to JTI UX students with a score of 3.3. An example of a factor that is considered a threat is that JTI UX is not well known among high schools with a score of 2.45. The lowest value of the threat is that the economic ability of the Indonesian people to study at universities is still low with a score of 2.18.

SeOnce the rating values for all statements and the weight values are known, the next step is to calculate the score for each statement by multiplying the weight value obtained by the rating value for each statement. After knowing how much the score is, the scores are added up, such as the score on the internal matrix is 2.781 and for the external matrix is 2.754. These values will be used to find out where the SWOT quadrant of Industrial Engineering University X is. Since the scale used in this questionnaire is from 1-4, the total score on the internal matrix and the external matrix must be reduced by 2.5 so that the SWOT quadrant point is located. at point 0.0. After the value of the internal matrix and external matrix is reduced by 2.5, the result of the internal matrix is 0, 281 and the external matrix is 0.254. After knowing this value, when combined with the SWOT quadrant, the result is that the Department of Industrial Engineering, University X is in quadrant I. In quadrant I the strategy used is an aggressive strategy.

3.3.4.2 SWOT Implementation Analysis

After the analysis of internal and external factors will be determined by the quadrant position in the Department of Industrial Engineering, University X. The position of the Department is in the aggressive strategy which will be adjusted to the SWOT in accordance with the quadrant I strategy.

3.3.4.3 QSPM Matrix Analysis

At this stage the strategy obtained from the SWOT matrix will be compiled with internal and external factors on the strategy that has been obtained to determine the relative attractiveness of the strategy. This is done to get the best results from the existing strategies. When determining the relative attractiveness of external and internal factors are used to influence whether these factors can affect the strategy being made. The value of relative attractiveness is not used at all because the value of attractiveness is used if these factors affect the strategy. The attraction can be asked to the head of the Department. If the answer is yes, then the factors can be compared. If the answer is no, then this factor does not need to be compared with the existing strategy because it has no influence on the results of the strategy to be given. An example of factors that are not needed is in JTI UX students can be involved in lecturer research. An example of the required factors is that JTI UX already has A accreditation. After getting which factors to compare, the unrelated factors do not need to be compared. After separating the factors that must be compared with the six strategies that have been made. The results of the comparison between the factors and the strategies the Department can implement the strategies that have been made, of the six strategies for the Department, the more recommended of the six are: (1.) Increase accreditation to international level. Because increasing international accreditation is considered very suitable to make the name of Industrial Engineering rise, because with international accreditation it can make it easier to find cooperation with outside companies and also get added value in Industrial Engineering from the perspective of prospective students. (2) Increase the number of lecturers who are involved in joint research on S2 and S3 lecturers. Improving joint research allows for high marks to be obtained by Industrial Engineering University X, because of the collaboration with various universities both at home and abroad and with various companies, it is possible to create international journals and also various kinds of problem solving in various companies that can be seen by prospective students and prospective students in which way can attracted attention because many saw Industrial Engineering University X through this article. In addition, the employee concerned with the company can provide recommendations to children or relatives who are looking for college. (3) Add and expand cooperation in the fields of education, research, and community service with external parties. Adding and expanding cooperation with the community is considered quite good, because the community can interact with lecturers or students who participate in serving the community. The interaction with the community can spread the name of University X Industrial Engineering to prospective students in these areas. (4) Making Industrial Engineering graduates who are in national or international industries to help fill guest lectures on JTI UX. Guest lectures can provide insight into Industrial Engineering and existing job opportunities. (5) Increase the number of cooperation with international industry. Prospective students can be interested in entering Industrial Engineering University X because it is considered there is a link for International industry. (6) Socializing the achievements of the Industrial Engineering Department of University X which has been accredited A and the average GPA of graduates is above 3 to high school and junior high school students.

4. CONCLUSION

Based on the results of the first distributed questionnaire where the contents of the questionnaire are comparing Industrial Engineering University X at other universities about how well high school students know the Department of Industrial Engineering at University X. Based on the questionnaire Industrial Engineering University X is in the first rank to be reminded (brand recognition) from all Industrial Engineering at other PTN, which earned a percentage of 46%. The right strategy that must be carried out by Industrial Engineering University X is to use an aggressive strategy which is obtained from the SWOT quadrant which shows in quadrant 1 with an internal value of 0.281 and an external value of 0.254. The SWOT strategy used here is the SO strategy, including: Socializing the achievement of JTI UX which has been accredited A and an

average GPA of above 3 to high school and junior high school students. Increase the number of lecturers who are involved in Joint Research on S2 and S3 lecturers. c. Increase accreditation to international level. Making Industrial Engineering graduates who are in national or international industries to help fill guest lectures at JTI UX. Increase the number of collaborations with international industry. Add and expand cooperation in the fields of education, research, and community service with external parties both at the national and international levels. In the last analysis using the QSPM method, it can be seen that the strategy that is highly recommended for Industrial Engineering at University X is to increase accreditation to an international level with a value of 4.06.

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